

CLAIMS

What is claimed is:

- 1 1. A system for sorting a mixed stream of different colored objects into separate groups of
2 same colored objects comprising: a plurality of sorting devices for receiving an input
3 feed of different colored objects and sorting the different colored objects into a plurality
4 of output feeds, wherein at least one output feed in the plurality of output feeds is a
5 subsequent input feed to one or more sorting devices in the plurality.
- 1 2. The system according to claim 1 wherein the one or more sorting devices sort the at least
2 one subsequent input feed into a plurality of further sorted output feeds.
- 1 3. The system according to claim 1 wherein at least one of the plurality of sorting devices is
2 a final sorting device, wherein the final sorting device sorts one or more subsequent input
3 feeds into a plurality of final output feeds.
- 1 4. The system according to claim 1 wherein at least one of the plurality of output feeds
2 contains objects of a desired color.
- 1 5. The system according to claim 1 wherein at least one of the plurality of output feeds
2 contains undesired objects, wherein the undesired objects are directed to a rejection bin.
- 1 6. The system according to claim 5 wherein at least one of the plurality of output feeds
2 contains flint objects.
- 1 7. The system according to claim 3 wherein the final sorting device directs each of the
2 plurality of final output feeds into a plurality of corresponding storage bins.

- 1 8. The system according to claim 1 wherein the objects are glass cullets.
- 1 9. The system according to claim 8 wherein each sorting device sorts the received different
2 cullets based on light transmission properties of the colored cullets.
- 1 10. The system according to claim 9 wherein each sorting device further comprises a light
2 emitting source for transmitting at least one light of predetermined frequency through the
3 glass cullet.
- 1 11. The system according to claim 10 wherein each sorting device further comprises a sensor
2 module coupled to the light emitting source and configured to receive light transmitted
3 through the glass cullet, wherein the sorting device determines the color of the cullet
4 from the at least one light received.
- 1 12. The system according to claim 10 wherein the light emitting source includes one or more
2 of a red light emitting diode, a green light emitting diode, a blue light emitting diode and
3 an infrared light source.
- 1 13. The system according to claim 11 wherein the sorting device further comprises at least
2 one actuator coupled to the sensor module, wherein the at least one actuator directs the
3 cullet to one of the plurality of output feeds depending on a signal provided by the sensor
4 module.
- 1 14. The system according to claim 1 further comprising at least one actuator coupled for
2 directing the object to one of the plurality of output feeds depending on a color
3 characteristic of the object.

- 1 15. A method of effectively sorting a group of different colored objects into separate groups
2 of similar colored objects comprising:
3 a. receiving an input feed having a plurality of objects; and
4 b. sorting the input feed into a plurality of output feeds, wherein at least one output
5 feed in the plurality of output feeds serves as a subsequent input feed.
- 1 16. The method according to claim 15 further comprising further sorting the at least one
2 subsequent input feed into a plurality of subsequent output feeds.
- 1 17. The method according to claim 15 further comprising receiving at least one of the
2 plurality of subsequent output feeds and sorting the received the at least one subsequent
3 output feeds into a plurality of final output feeds.
- 1 18. The method according to claim 17 further comprising directing each of the plurality of
2 final output feeds into a corresponding container.
- 1 19. The method according to claim 15 wherein at least one of the plurality of output feeds
2 contains undesired objects, wherein the undesired objects are directed to a rejection bin.
- 1 20. The method according to claim 15 wherein at least one of the plurality of output feeds
2 contains flint objects.
- 1 21. The method according to claim 15 wherein at least one of the plurality of output feeds
2 substantially contains objects of a desired color.
- 1 22. The method according to claim 15 wherein the objects are glass culllets.

- 1 23. The method according to claim 22 wherein the cullets are sorted based on light
2 transmission properties of the colored cullets.
- 1 24. The method according to claim 23 wherein sorting further comprises emitting at least one
2 light of predetermined frequency through the cullet.
- 1 25. The method according to claim 24 wherein the at least one light includes one or more of
2 a red light emitting diode, a green light emitting diode, a blue light emitting diode and an
3 infrared light source.
- 1 26. The method according to claim 24 wherein sorting further comprises sensing light
2 transmitted through the cullet and determining a color characteristic of the cullet from the
3 light received.
- 1 27. The method according to claim 26 wherein sorting further comprises directing the cullet
2 to one of the plurality of output feeds depending on the color characteristic determined.
- 1 28. The method according to claim 15 further comprising directing the object to one of the
2 plurality of output feeds depending on a color characteristic of the object being
3 determined.

- 1 29. A method of effectively sorting different colored objects into a plurality of groups of
2 objects having a similar desired quality, the method comprising:
- 3 a. providing a plurality of sorting devices, wherein each sorting device receives a
4 mixture of objects of different qualities and separates the different received
5 objects into a plurality of output feeds, each output feed having objects of a
6 substantially similar quality; and
- 7 b. configuring the plurality of sorting devices such that at least one output feed in
8 each of one or more sorting devices in the plurality is input into a corresponding
9 subsequent sorting device.
- 1 30. The method according to claim 29 wherein the one or more number of sorting devices
2 sort at least one received subsequent output feed into a plurality of further sorted output
3 feeds.
- 1 31. The method according to claim 29 wherein at least one of the plurality of sorting devices
2 is a final sorting device, wherein the final sorting device sorts at least one received
3 subsequent output feed into a plurality of final output feeds.
- 1 32. The method according to claim 29 further comprising configuring a rejection bin to store
2 at least one of the plurality of output feeds containing undesired objects.
- 1 33. The method according to claim 32 wherein at least one of the plurality of output feeds
2 contains flint objects.
- 1 34. The method according to claim 33 wherein at least one of the plurality of output feeds
2 contains objects of a desired color.

- 1 35. The method according to claim 31 wherein the final sorting device directs each of the
2 plurality of final output feeds into a corresponding storage bin.
- 1 36. The method according to claim 29 wherein the objects are glass cullets.
- 1 37. The method according to claim 36 wherein each sorting device sorts the received glass
2 cullets based on light transmission properties of the glass cullets.
- 1 38. The method according to claim 37 wherein the sorting device further comprises means
2 for transmitting at least one light of predetermined frequency through the glass cullet.
- 1 39. The method according to claim 38 wherein the at least one light includes one or more of
2 a red light emitting diode, a green light emitting diode, a blue light emitting diode and an
3 infrared light source.
- 1 40. The method according to claim 38 wherein the sorting device further comprises means
2 for sensing light transmitted through the glass cullet, wherein the sorting device
3 determines the color of the glass cullet from the light sensed.
- 1 41. The method according to claim 40 wherein the sorting device further comprises means
2 for actuating coupled to the means for sensing, wherein the means for actuating directs
3 the glass cullet to one of the plurality of output feeds depending on a signal provided by
4 the means for sensing.
- 1 42. The method according to claim 29 wherein the sorting device further comprises means
2 for directing the object to one of the plurality of output feeds depending on a color
3 characteristic of the object.

- 1 43. A multi-level sorting system for separating different colored cullets into cullets having
2 substantially similar color characteristics comprising:
- 3 a. a first means for sorting the cullets, wherein the first means for sorting directs the
4 sorted cullets into a plurality of first output paths;
- 5 b. a second means for further sorting at least one received first output path, wherein
6 the second means for sorting directs the further sorted cullets into a plurality of
7 second output paths;
- 8 c. a third means for subsequently sorting at least one received first output path and
9 at least one received second output path, wherein the third means for sorting
10 directs the subsequently sorted cullets into a plurality of third output paths.
- 1 44. A multi-level sorting system for separating a mixed stream of colored cullets into cullets
2 having substantially similar color characteristics comprising:
- 3 a. a first stage tri-sorter for sorting the cullets, wherein the first stage tri-sorter
4 directs the sorted cullets into a plurality of first output paths;
- 5 b. a second stage tri-sorter coupled to the first stage tri-sorter, the second stage tri-
6 sorter for sorting cullets in at least one received first output path, thereby forming
7 second sorted cullets, wherein the second stage tri-sorter directs the second sorted
8 cullets into a plurality of second output paths;
- 9 c. a third stage tri-sorter coupled to the first and second stage tri-sorters, the third
10 stage tri-sorter for sorting cullets in at least one received first output path and at
11 least one received second output path, thereby forming third sorted cullets,
12 wherein the third stage tri-sorter directs the third sorted cullets into a plurality of
13 third output paths.
- 1 45. The multi-level sorting system according to claim 44 wherein cullets in one of the
2 plurality of first output paths are sent to a rejected material bin.

- 1 46. The multi-level sorting system according to claim 44 wherein cullets in one of the
2 plurality of second output paths are sent to a rejected material bin.
- 1 47. The multi-level sorting system according to claim 44 wherein cullets in one of the
2 plurality of second output paths are sent to a high quality flint cullet bin.
- 1 48. The multi-level sorting system according to claim 44 wherein cullets in one of the
2 plurality of third output paths are sent to a high quality green cullet bin.
- 1 49. The multi-level sorting system according to claim 44 wherein cullets in one of the
2 plurality of third output paths are sent to a rejected material bin.
- 1 50. The multi-level sorting system according to claim 44 wherein cullets in one of the
2 plurality of third output paths are sent to a high quality brown cullet bin.
- 1 51. The multi-level sorting system according to claim 44 wherein each sorting device sorts
2 the received cullets based on light transmission properties of the colored cullets.
- 1 52. The multi-level sorting system according to claim 51 wherein each sorting device further
2 comprises a light emitting source for transmitting at least one light of predetermined
3 frequency through the glass cullet.
- 1 53. The multi-level sorting system according to claim 52 wherein each sorting device further
2 comprises a sensor module coupled to the light emitting source and configured to receive
3 light transmitted through the glass cullet, wherein the sorting device determines the color
4 of the cullet from the at least one light received.

- 1 54. The multi-level sorting system according to claim 53 wherein the light emitting source
2 includes one or more of a red light emitting diode, a green light emitting diode, a blue
3 light emitting diode and an infrared light source.
- 1 55. The multi-level sorting system according to claim 53 wherein each sorting device further
2 comprises at least one actuator coupled to the sensor module, wherein the at least one
3 actuator directs the cullet to one of the plurality of output feeds depending on a signal
4 provided by the sensor module.
- 1 56. The multi-level sorting system according to claim 44 further comprising at least one
2 actuator coupled for directing the cullet to one of the plurality of output feeds depending
on a color characteristic of the cullet.
- 1 57. A multi-level sorting system for separating a mixed stream of colored cullets into cullets
2 having substantially similar color characteristics comprising:
3 a. a plurality of first stage tri-sorters for sorting the cullets, wherein the plurality of
4 first stage tri-sorters direct the sorted cullets into a plurality of first output paths;
5 b. a second stage tri-sorter coupled to the plurality of first stage tri-sorters, the
6 second stage tri-sorter for sorting cullets in at least one received first output path
7 from each first stage tri-sorter, thereby forming second sorted cullets, wherein the
8 second stage tri-sorter directs the second sorted cullets into a plurality of second
9 output paths;
10 c. a third stage tri-sorter coupled to the plurality of first stage tri-sorters and the
11 second stage tri-sorter, the third stage tri-sorter for sorting cullets in at least one
12 received first output path from each of the plurality of first stage tri-sorters and at
13 least one received second output path, thereby forming third sorted cullets,
14 wherein the third stage tri-sorter directs the third sorted cullets into a plurality of
15 third output paths.

- 1 58. The multi-level sorting system according to claim 57 wherein cullets in one of the
2 plurality of first output paths from each first stage tri-sorter are sent to one or more
3 rejected material bins.
- 1 59. The multi-level sorting system according to claim 57 wherein cullets in one of the
2 plurality of second output paths are sent to a rejected material bin.
- 1 60. The multi-level sorting system according to claim 57 wherein cullets in one of the
2 plurality of second output paths are sent to a high quality flint cullet bin.
- 1 61. The multi-level sorting system according to claim 57 wherein cullets in one of the
2 plurality of third output paths are sent to a high quality green cullet bin.
- 1 62. The multi-level sorting system according to claim 57 wherein cullets in one of the
2 plurality of third output paths are sent to a rejected material bin.
- 1 63. The multi-level sorting system according to claim 57 wherein cullets in one of the
2 plurality of third output paths are sent to a high quality brown cullet bin.
- 1 64. The multi-level sorting system according to claim 57 wherein each sorting device sorts
2 the received cullets based on light transmission properties of the colored cullets.
- 1 65. The multi-level sorting system according to claim 64 wherein each sorting device further
2 comprises a light emitting source for transmitting at least one light of predetermined
3 frequency through the glass cullet.

- 1 66. The multi-level sorting system according to claim 65 wherein each sorting device further
2 comprises a sensor module coupled to the light emitting source and configured to receive
3 light transmitted through the glass cullet, wherein the sorting device determines the color
4 of the cullet from the at least one light received.
- 1 67. The multi-level sorting system according to claim 66 wherein the light emitting source
2 includes one or more of a red light emitting diode, a green light emitting diode, a blue
3 light emitting diode and an infrared light source.
- 1 68. The multi-level sorting system according to claim 66 wherein each sorting device further
2 comprises at least one actuator coupled to the sensor module, wherein the at least one
3 actuator directs the cullet to one of the plurality of output feeds depending on a signal
4 provided by the sensor module.
- 1 69. The multi-level sorting system according to claim 57 further comprising at least one
2 actuator coupled for directing the cullet to one of the plurality of output feeds depending
 on a color characteristic of the cullet.